بسم الله الرحمن الرحيم

عنوان المحاضرة: Nerve injuries - Compartment Syndrome

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Supracondylar fracture in children (Exam Q):

-Mechanism: fall on the outstretched hand

-Pathological Anatomy:

▪The distal fragment commonly displaced posteriorly 90% (extension) rarely anteriorly 10% (flexion)

▪Spike of the proximal fragment penetrates the brachialis and may injure the brachial a. or median n.

-Clinical presentation:

▪History of trauma ▪Pain and swelling over the elbow region ▪S- shaped deformity ▪Crepitus

▪The relationship between olecranon, medial and lateral epicondyles are normal (normal triangle).

▪Distal neurovascular examination for signs of injury

▪Posteromedial # →more risk on the median nerve

▪Rotation of the distal fragment usually occurs medially leading to cupitus varus deformity malunion

Treatment:

1-Undisplaced: Above elbow cast

2-Displaced:

▪Closed reduction under general anesthesia + above elbow cast

▪Closed reduction and percutaneous pinning

▪ORIF if unable to maintain reduction

Complications:

A) Early:

1-Nerve injuries: See below 2-Vascular: ▪Ischemia ▪Compartmental syndrome

B) Late

▪Volkmann's ischemic contracture ▪Stiffness ▪Myositis ossificans

▪Deformity ▪Delayed neuritis ▪Nonunion ▪O.A.

Compartment Syndrome: (Exam Q)

-Muscle ischemia due to stoppage of capillary circulation due to increase pressure inside a fascial compartment of the arm, forearm or leg

-Pathology:

Increase pressure inside the closed compartment (due to bleeding and edema) → muscle ischemia → anaerobic metabolism → increase lactic acid → increase capillary permeability → edema → more increase in pressure → more muscle ischemia ..⋯ and so on.

-If untreated within 6 – 12 hours, muscles undergo necrosis → fibrosis and ischemic contracture

-Clinically:

▪Intact pulse, no manifestations of ischemia in hand or foot

▪Most important symptom is bursting PAIN which is out of proportion of fracture.

▪Weakness of affected muscles

▪Confirmed by a Provocative test:

Passive extension of fingers → stretch of ischemic muscles (very sensitive to pain) → severe pain

-Treatment:

Decompression of affected compartment(s), fasciotomy

Study also → Lateral Condylar #

	Radial	Median	Ulnar
Origin	Posterior cord of brachial plexus.	Medial cord	2 roots from (medial) and (lateral).
Sensory supply	Lateral (radial) 2/3 of dorsum of hand.	Lateral 2/3 of palmar aspect of hand.	*Medial (ulnar) 1/3 of palm & dorsum aspect of hand. *Medial 1.5 fingers (anterior and posterior).
Autonomous zone	Skin over 1st web space.	Tip of index.	Tip of little finger.
Motor supply	All extensors of elbow, wrist and fingers.	*All flexor muscles of forearm (except 1.5 muscles). *Thenar muscles of hand: ●flexor pollicis brevis ●abductor pollicis brevis ●opponens pollicis *Lateral 2 lumbricals.	*1.5 muscles in forearm (flexor carpi ulnaris, medial ½ of flexor digitorum profundus). *All other 15 intrinsic muscles of hand: ●4 palmar interossei ●4 dorsal interossei ●medial 2 lumbricals ●4 hypothenar muscles ●adductor pollicis
Injury			
Site	-Axilla: Clutch, Saturday night. -Arm (spiral groove): humerus # -Posterior interosseous nerve: (Purely motor, supply extensors of fingers): fracture of neck of radius, Monteggia fracture.	Commonest site is near wrist then up in the forearm. Common example: Inside carpal tunnel.	Usually fractures around elbow and around wrist. e.g. Lateral condylar fractures (delayed ulnar neuropathy).
Sensory effect	Loss of sensation at areas supplied by nerve.		
Motor effect	Loss of action of muscles supplied by nerve, wasting, deformity.		
Autonomic effect	Dusky skin, loss of hair, brittle nails, loss of subcutaneous fat, tapered fingers.		
Deformity	Wrist drop and finger drop (Lesion in arm, axilla). Finger drop only (Lesion in forearm).	Ape hand (thumb is adducted, extended, wasting thenar eminence). Pointing index (when ask patient to close his fist).	Partial claw hand (Hyperextension of MCP, flexion of IPs of medial 2 fingers). *The higher the level of injury, less severity of deformity (ulnarparadox). *Wasting of hypothenar eminence, interossei.
Test	Ask patient to extend wrist, thumb, and fingers.	Count fingers.	Fanning fingers (test the palmar interossei) Paper / card test (test the dorsal interossei). Froment test (test the adductor pollicis).

This table is done by: **Saad Ayoub**